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Software Engineering Institute

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2006 State of Software Measurement Practice Survey

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Report Documentation Page

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Standard Form 298 (Rev. 8-98)
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Presentation Outline

❖ Introduction

- Survey objectives & approach
- The population being studied
- Sampling plan

❖ Results

- Response rates and outcome
- Population demographics
- Attitudes and beliefs about measurement use
- Measurement guidance used
- Measures that are reported

❖ Summary Observations

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Survey Objectives

The objectives of this survey are to characterize

- the degree to which software practitioners use measurement when conducting their work

- the perceived value of measurement

- approaches that are used to guide how measures are defined and used

- the most common types of measures used by software practitioners

Characteristics of the Survey

We used a structured, self-administered questionnaire that was available both via the World Wide Web and in paper form.

The questionnaire was designed to be short (17 questions) and easy-to-complete with questions phrased in close-ended format. Several questions allowed for short open-ended responses.

Stratified random sampling was used to select candidate respondents from a population comprised of members from three different subpopulations.

Candidate respondents were offered incentives to participate including

- platinum membership to the Software Engineering Information Repository (SEIR) that provides access to documents otherwise unavailable through regular membership

- early access to the survey results

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The Population Being Studied

The population that we would have *liked* to have studied is the entire existing body of software practitioners in the world. However, such a representative database was unavailable to us.

The population that we did use for this study included individuals who:

   1 were entered into the SEI customer relations database during 2004-2005

   2 registered to gain access to the SEI's Software Engineering Repository (SEIR) during 2004-2005

   3 became an SEI Member during 2004-2005

Sampling Plan

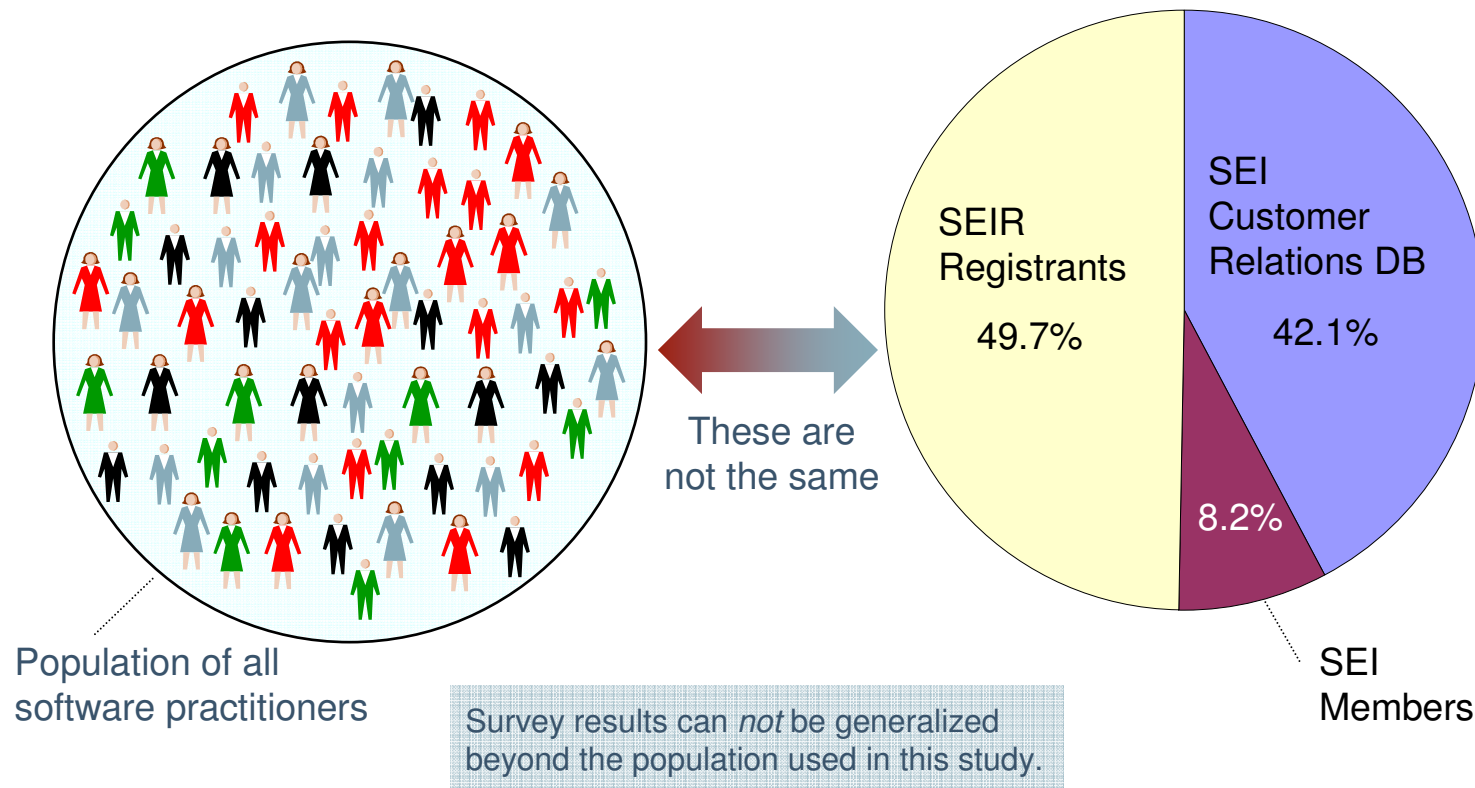| Subpopulation	Population Size	Sample Size	Adjusted Sample Size	Actual Sample Size
Customer Relations	6,398	603	2010	1670
SEI Members	1,242	434	1,242	951
SEIR registrants	7,540	612	2040	1539
Total	15,180	1,649	5,292	4,160

Calculated for:
precision of   ± 2.5%
confidence of   95%

Adjusted based on estimated 30% response outcome.

- Invalid email addresses
- Non-responses
- Ineligible respondents

Important to Remember When Interpreting Survey Results

Population of all software practitioners

These are not the same

SEIR Registrants 49.7%

SEI Customer Relations DB 42.1%

SEI Members 8.2%

Survey results can *not* be generalized beyond the population used in this study.

Presentation Outline

- ❖ Introduction
  - • Survey objectives & approach
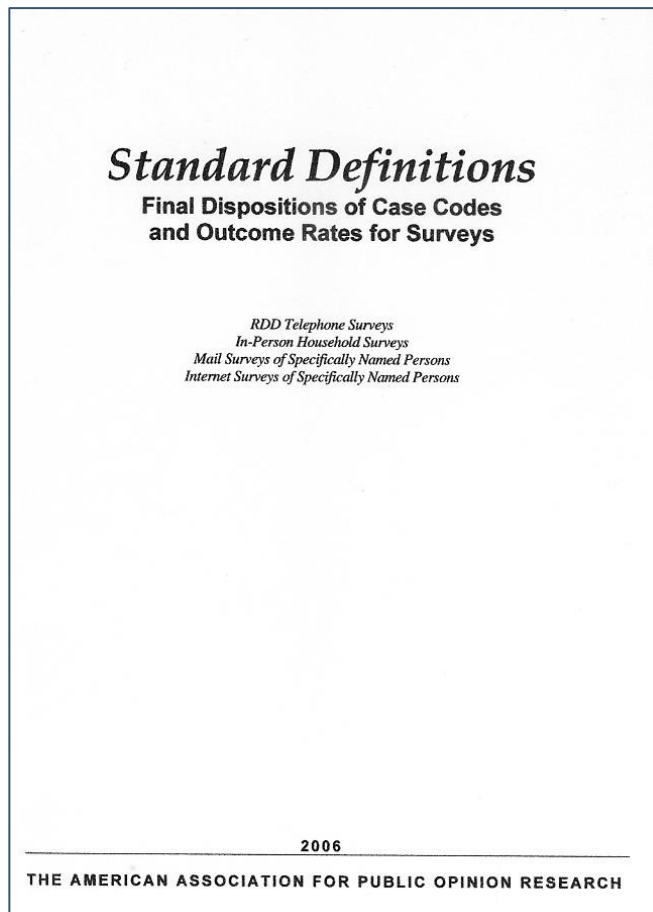 - • The population being studied
  - • Sampling plan

- ❖ Results
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- ❖ Summary Observations

Response Outcome Rates

Standard Definitions
Final Dispositions of Case Codes
and Outcome Rates for Surveys

RDD Telephone Surveys
In-Person Household Surveys
Mail Surveys of Specifically Named Persons
Internet Surveys of Specifically Named Persons

2006

THE AMERICAN ASSOCIATION FOR PUBLIC OPINION RESEARCH

Minimum Response Rate

$$RR1 = 42.4\%$$

Counts partial interviews as respondents

$$RR2 = 50.7\%$$

http://www.aapor.org/pdfs/standarddefs_4.pdf

84 Countries Represented

Respondents by Continent
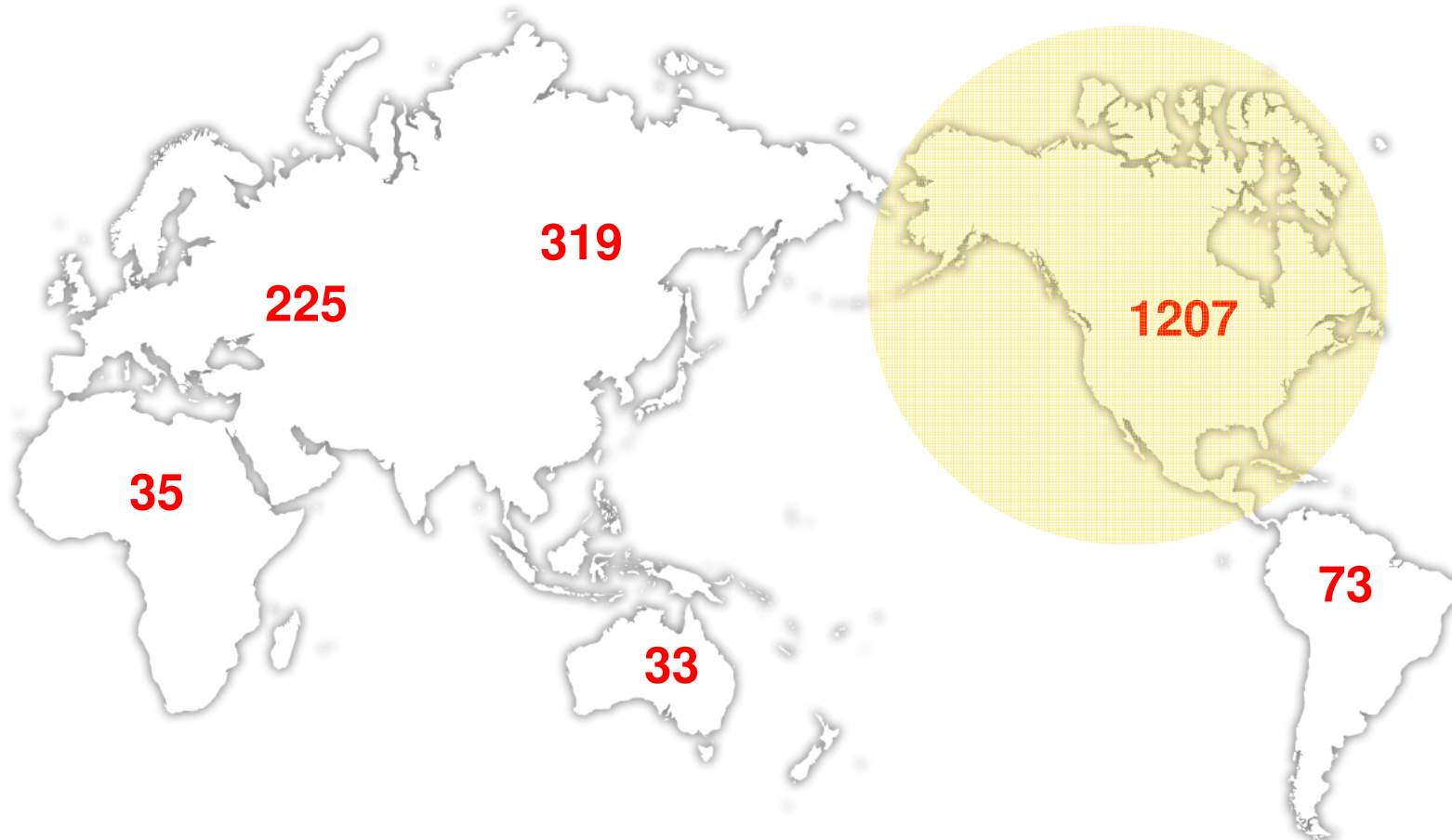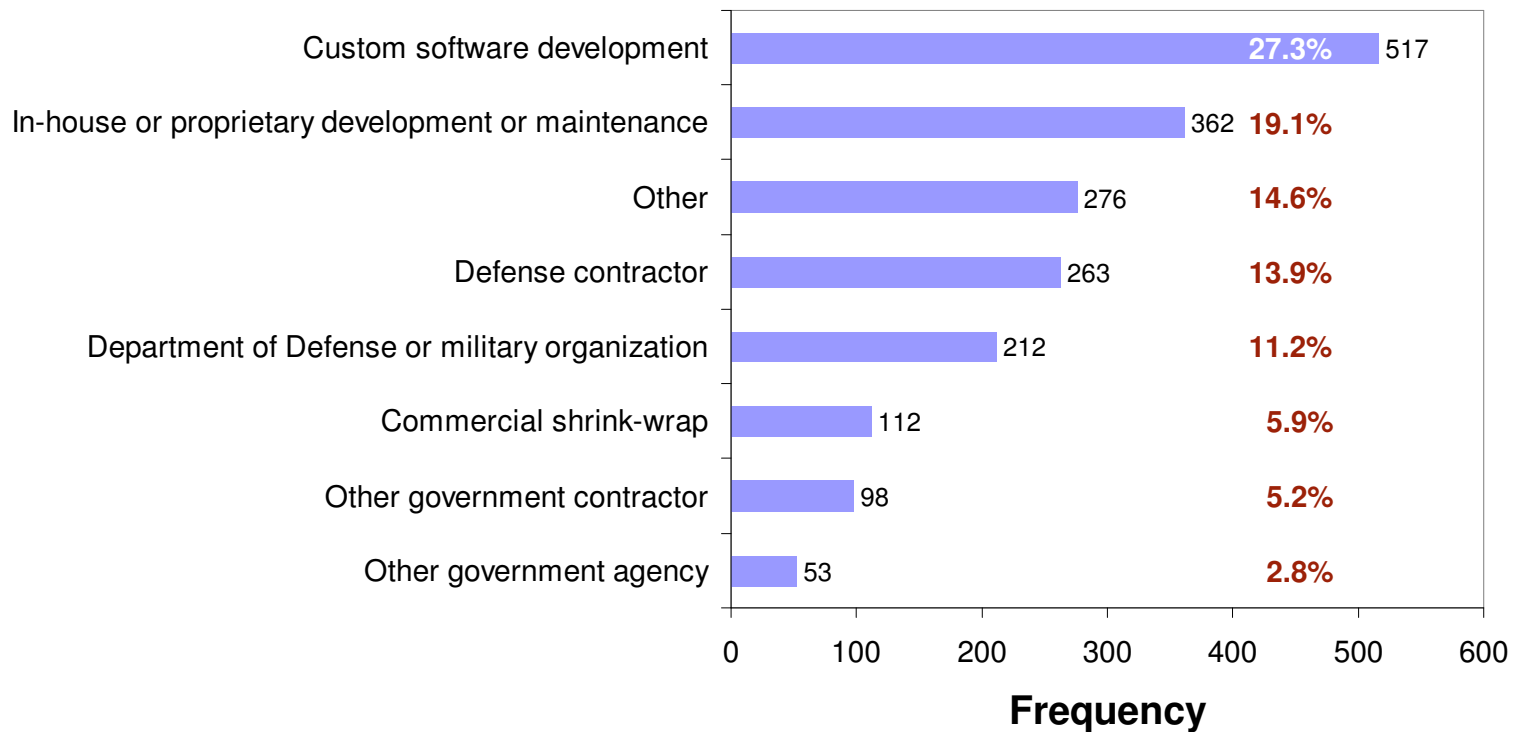
Survey Respondents
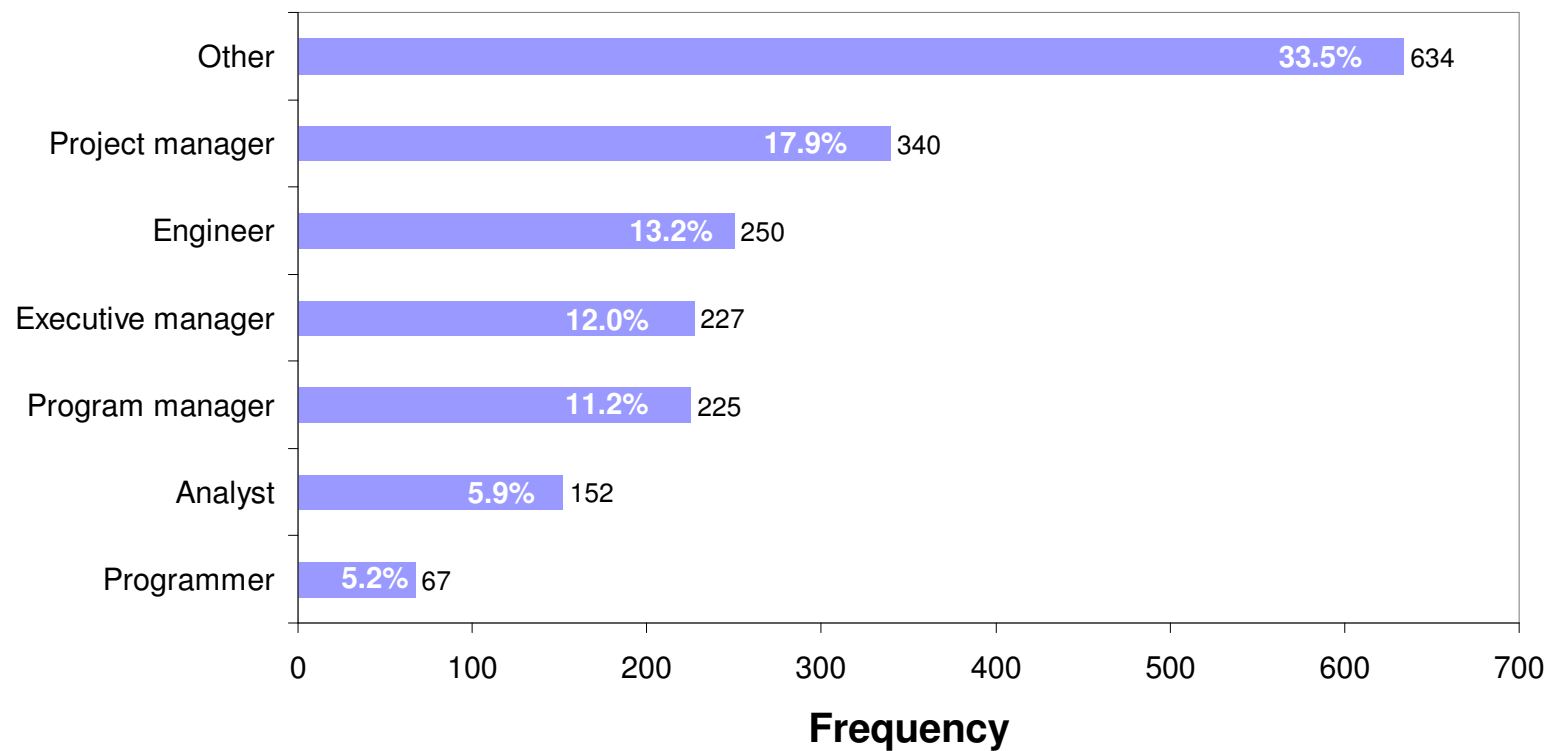
Approximate Population Proportions

DoD & Government

27.4%

72.6%
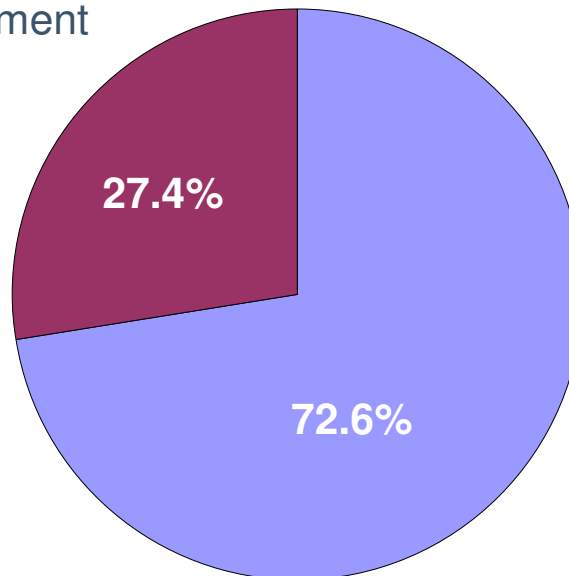
Commercial

Number of Full Time Employees

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Employees	Frequency
more than 2000	429 — **22.7%**
1001-2000	146
501-1000	145
301-500	152
201-300	128
101-200	229
76-100	101 — **5.3%**
51-75	114
26-50	178
25 or fewer	268

Frequency
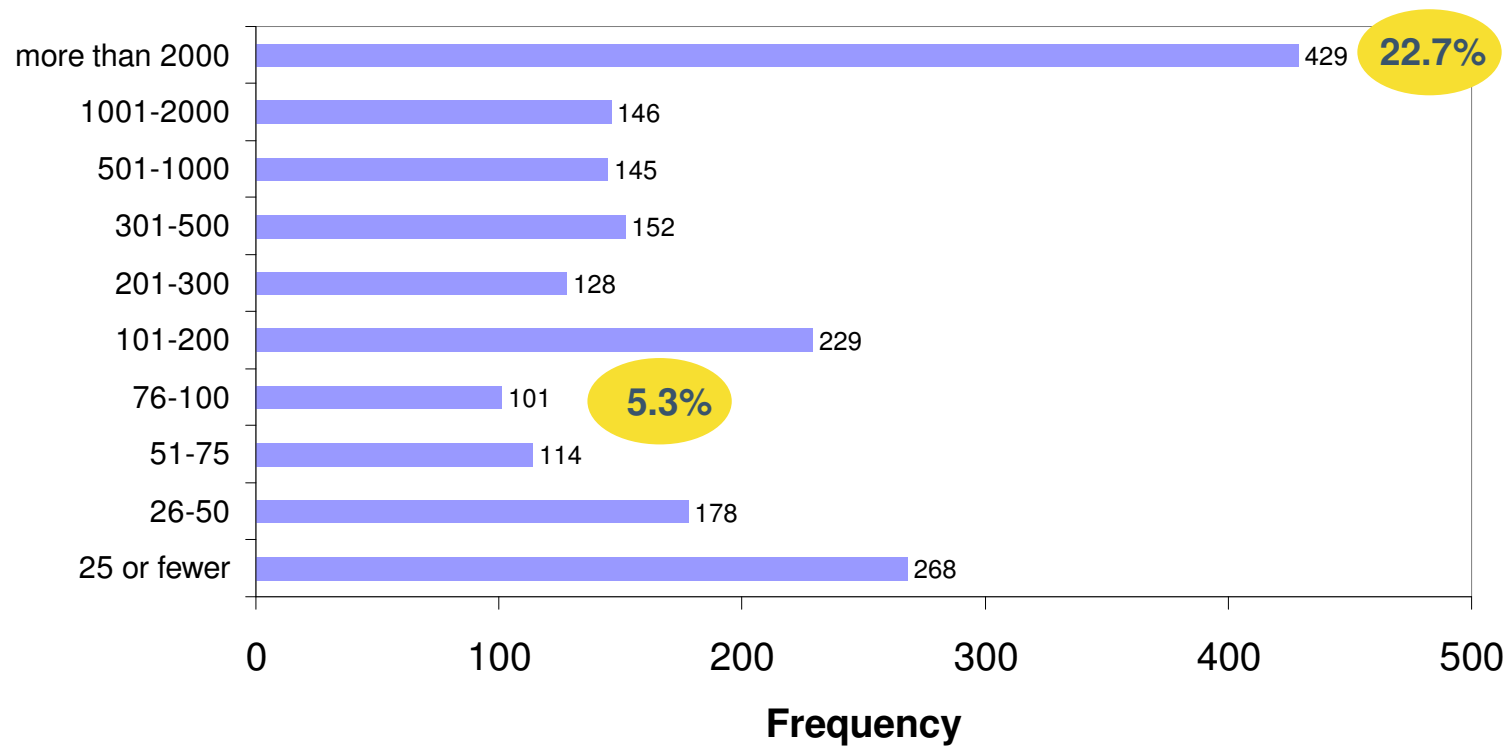
1890 Responses

Presentation Outline

❖ Results

- • Response rates and outcome
- • Were subpopulations different?
- • Population demographics
- ➡ Attitudes and beliefs about measurement use

  How are you involved with measurement?

  Are purposes for measurement understood?

  Does measurement help?

  Is measurement used to understand product/service quality?

  Documented measurement processes?
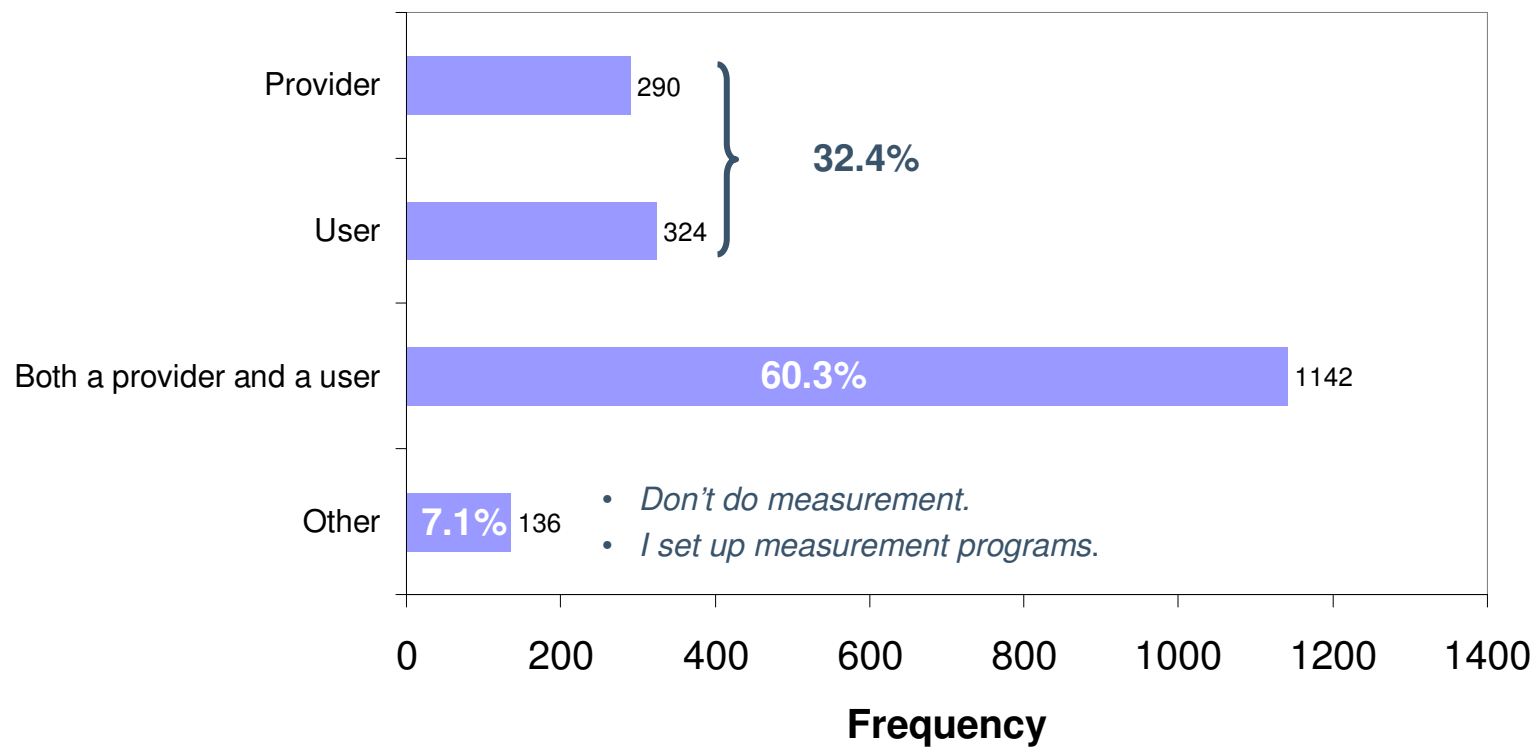
  Measurement definitions understood and consistent?

  Do measurable criteria exist for products and services?

  Is corrective action taken when thresholds are exceeded?

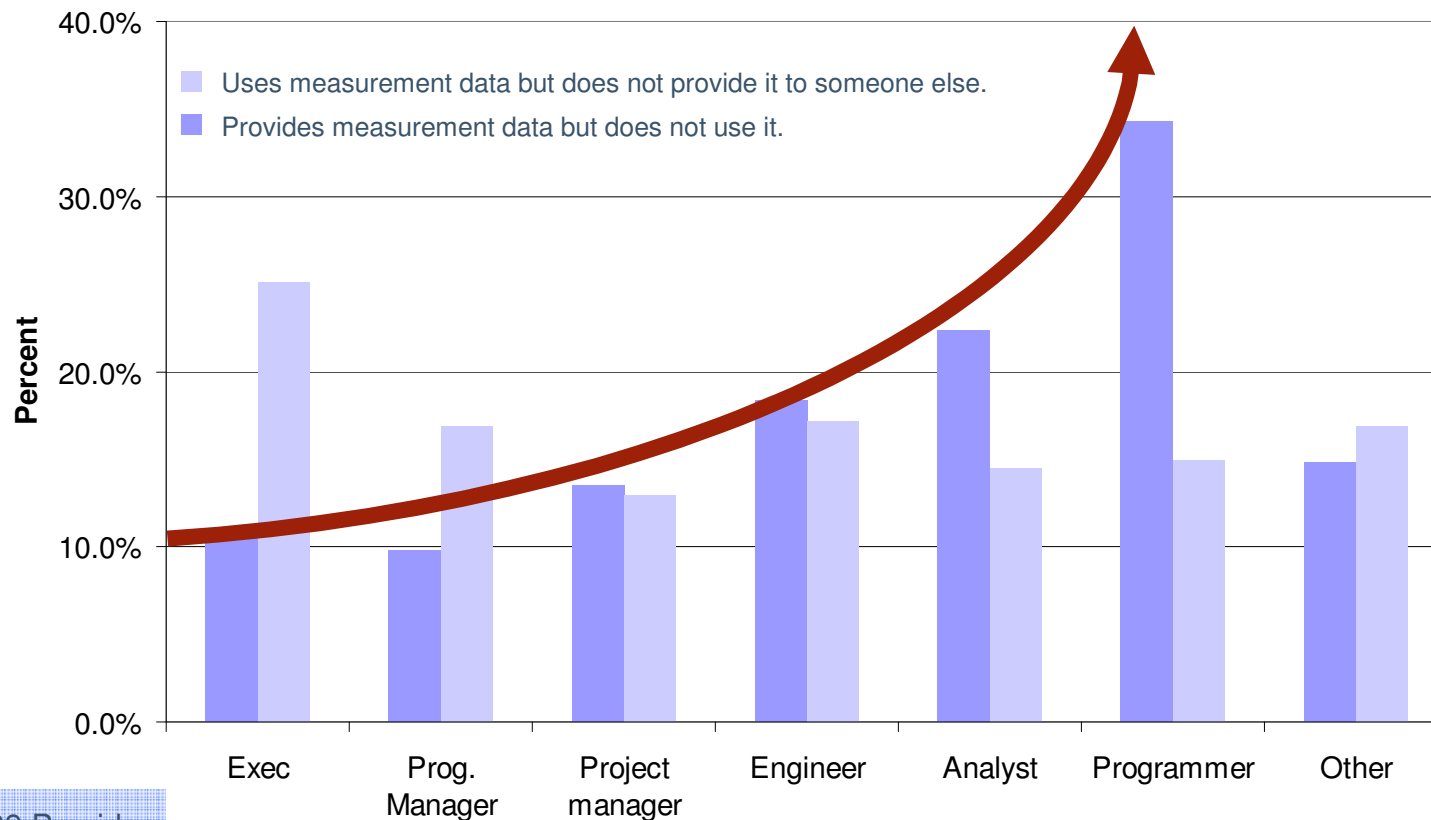- • Measurement guidance used
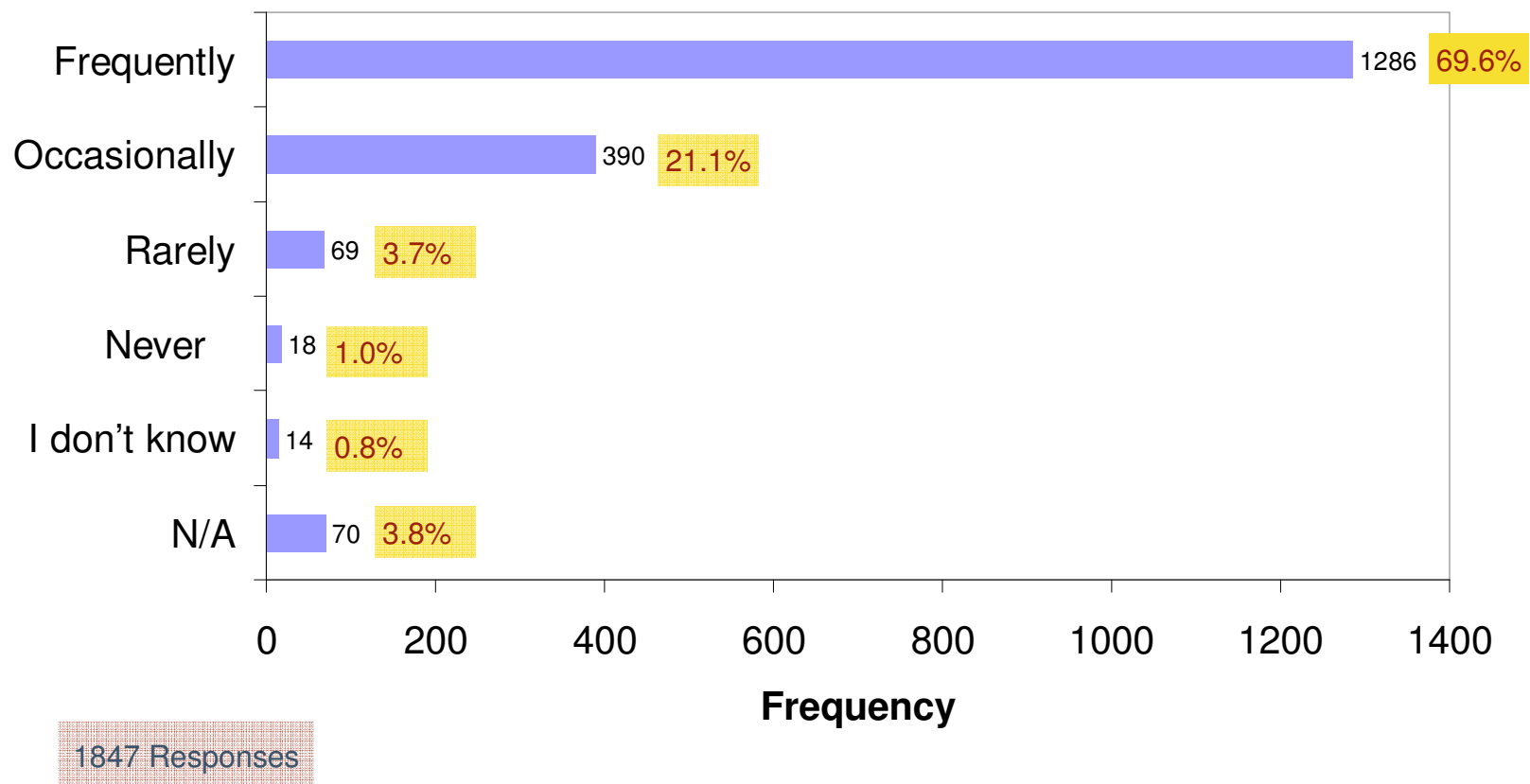- • Measures that are reported

Involvement With Measurement

Purpose for Measuring Is Understood

1847 Responses
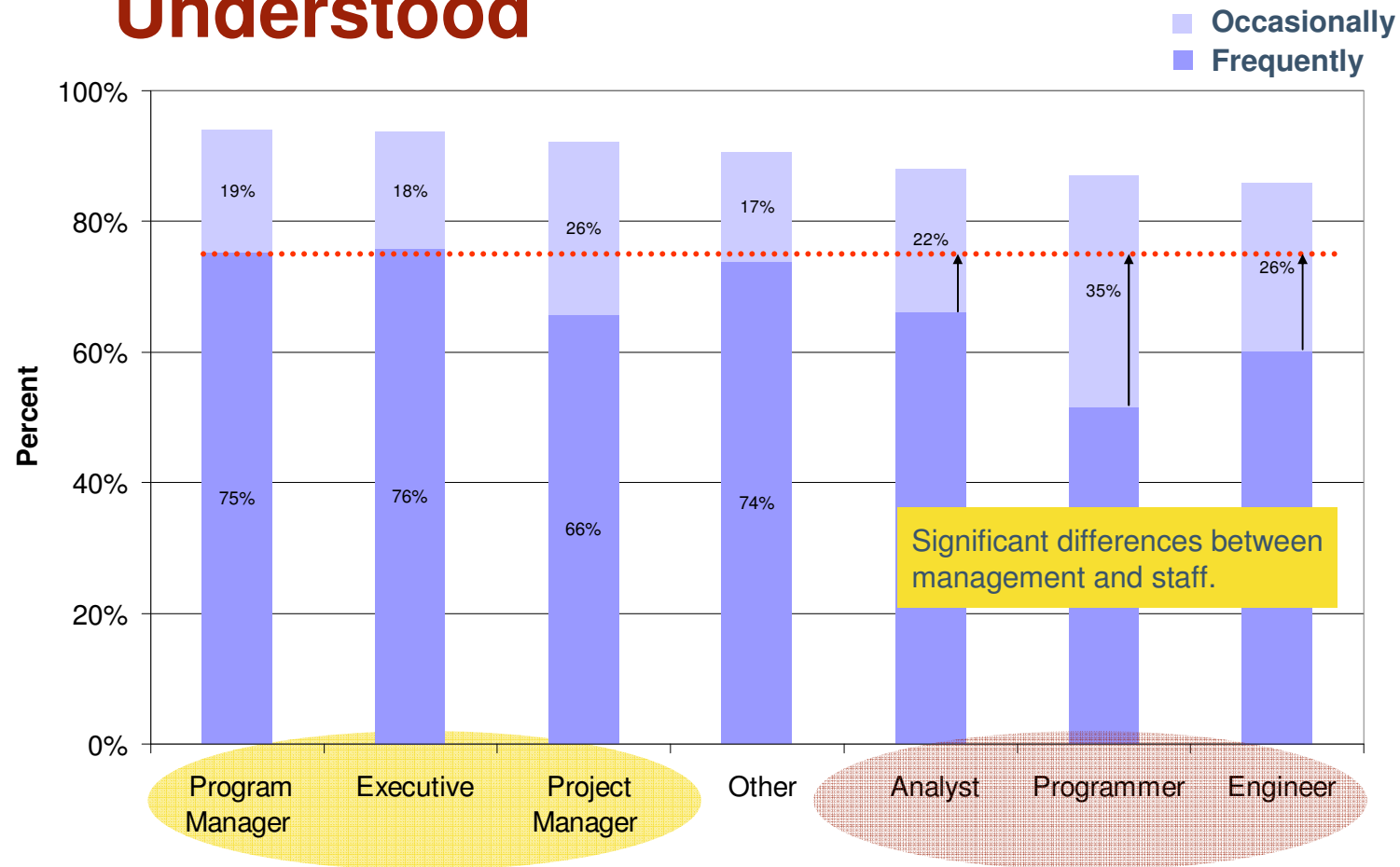
Believe That Measurement Helps (To Some Degree)

Agree: 92%

Disagree: 2%

N/A: 2%

Not sure: 4%
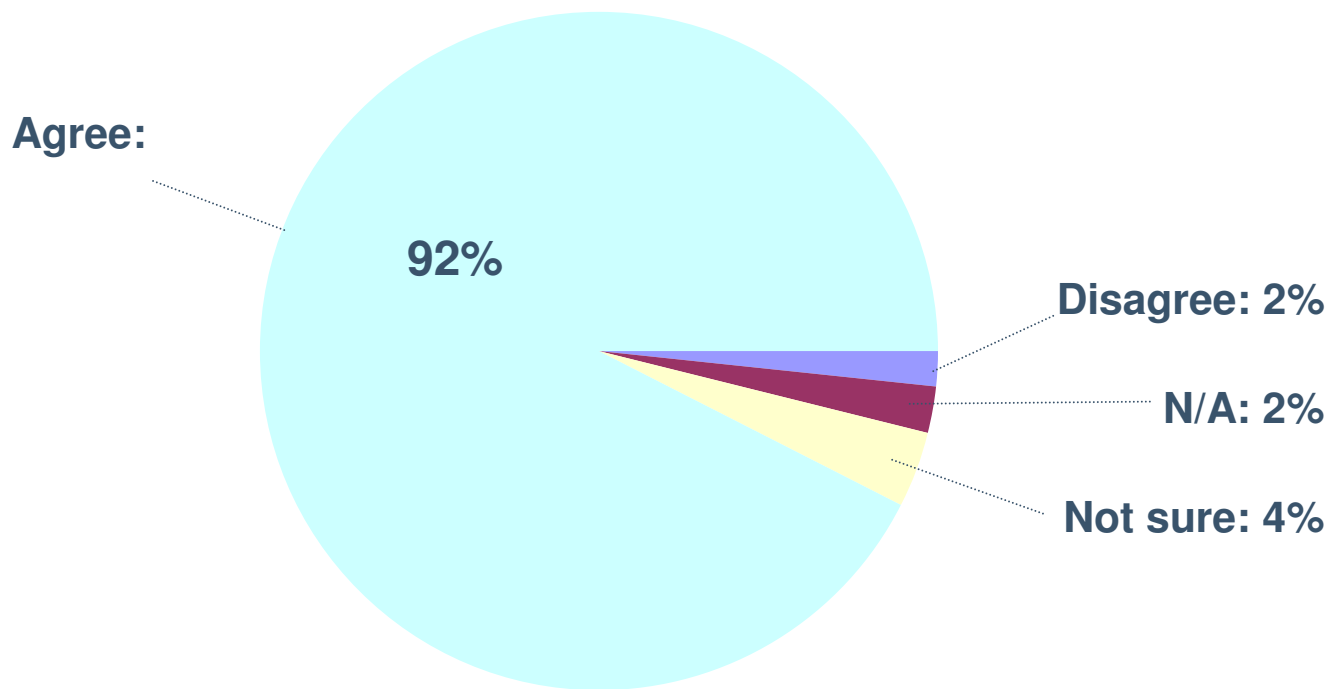
1868 Responses

Measurement Used to Understand Quality of Products & Services

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	Frequency	Percent
Frequently	825	44.5%
Occasionally	723	39%
Rarely	210	11.3%
Never	39	2.1%
I don't know	17	0.9%
N/A	38	2.1%

1852 Responses

Frequency
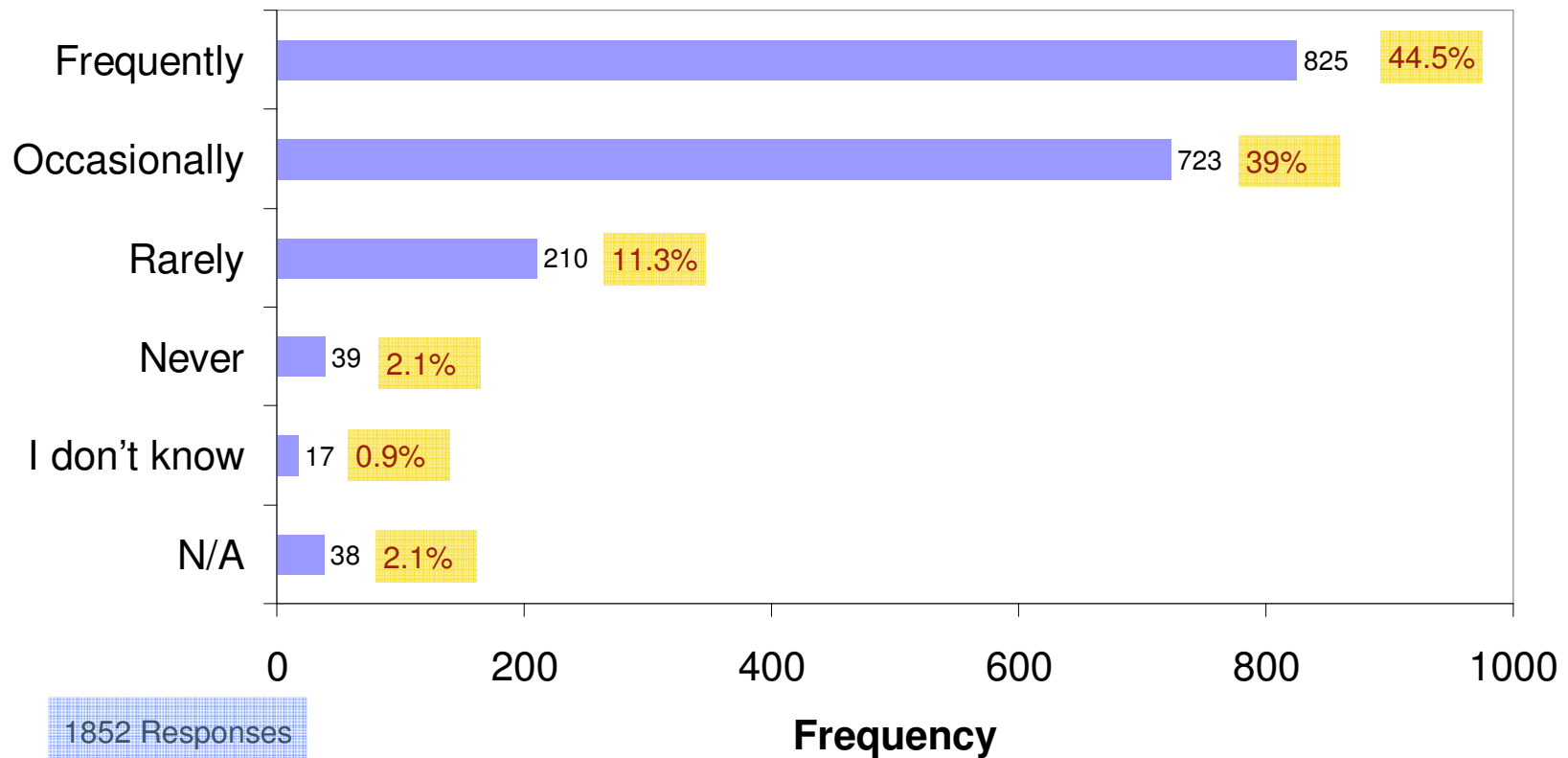
Documented Process for Collecting Measurement Data
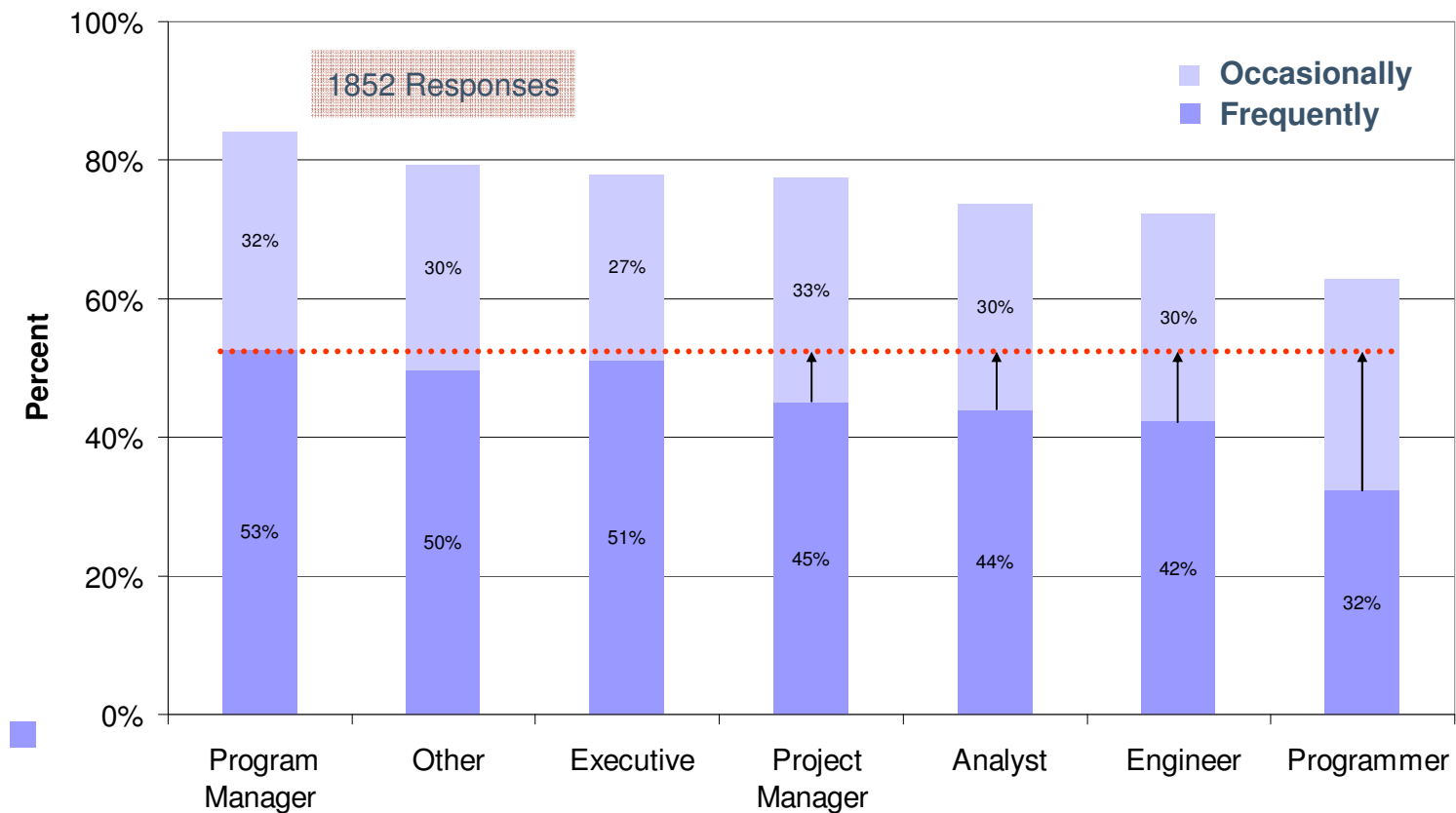
Measurement Definitions Are Understood & Consistent

Agree

70%

N/A: 2%

Disagree

24%

Not sure: 4%
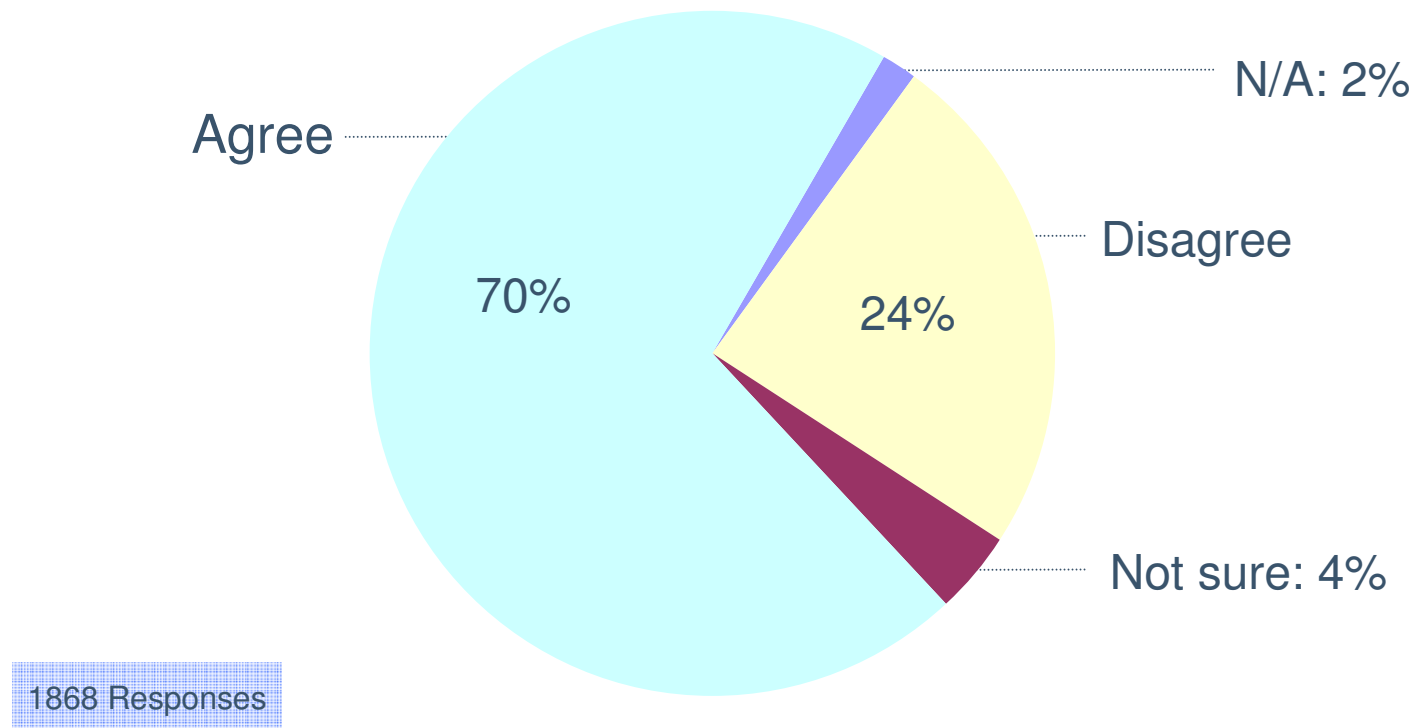
1868 Responses

Measurable Criteria Exist for Products & Services

Frequency chart:

- Frequently: 799 — 43.1%
- Occasionally: 711 — 38.4%
- Rarely: 233 — 12.6%
- Never: 31 — 1.7%
- I don't know: 30 — 1.6%
- N/A: 48 — 2.6%

Frequency
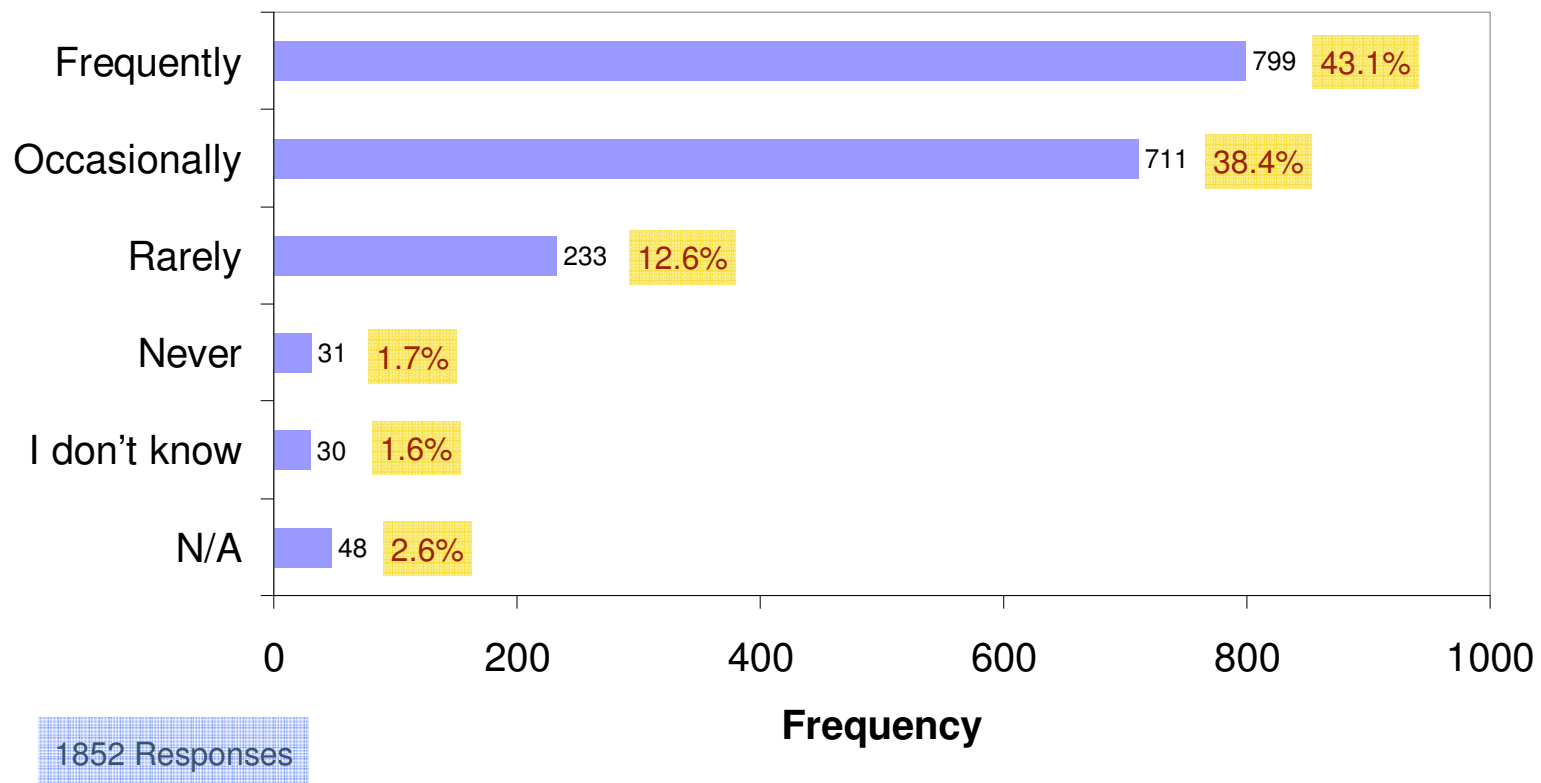
1852 Responses

Corrective Action Taken When Measurement Threshold Exceeded
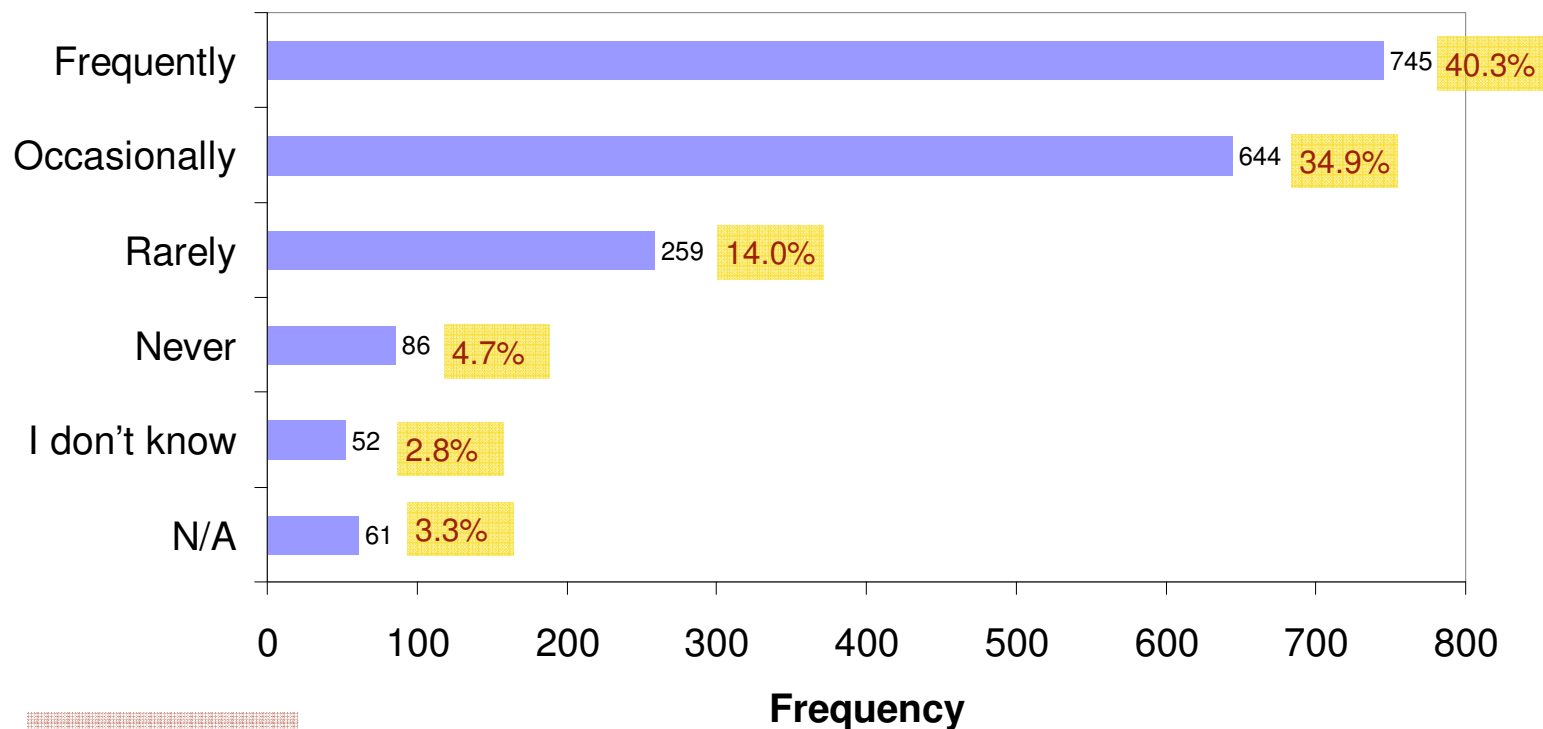
1847 Responses

Action-Oriented Response to Measurement Information

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❖ Summary Observations

Measurement Methods Used

The percentages do not add to 100% because some individuals use more than one method.

1868 Responses

"Other" Methods Used

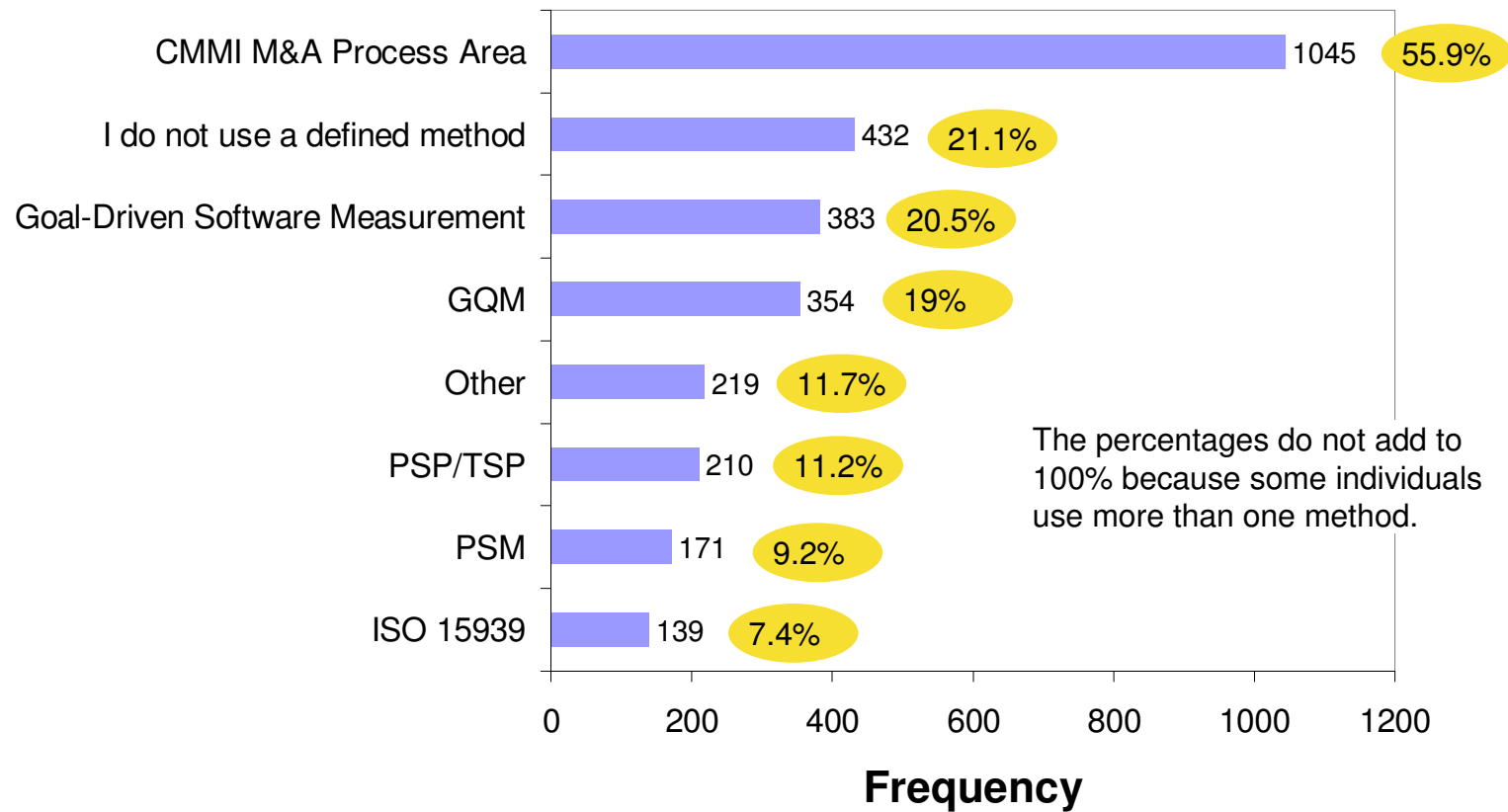| Method	Frequency
Home-Grown	39
No Metrics (comment)	32
Proprietary	25
Other	25
Customized from Other	20
CMM	19
Standards (IEEE, ISO, etc.)	17
Six-Sigma	15
ITIL	7
Balanced Scorecard	7
By Mandate	5
SPC	5
Function Points	3

Frequency

219 Responses

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  - ➡ • Measures that are reported
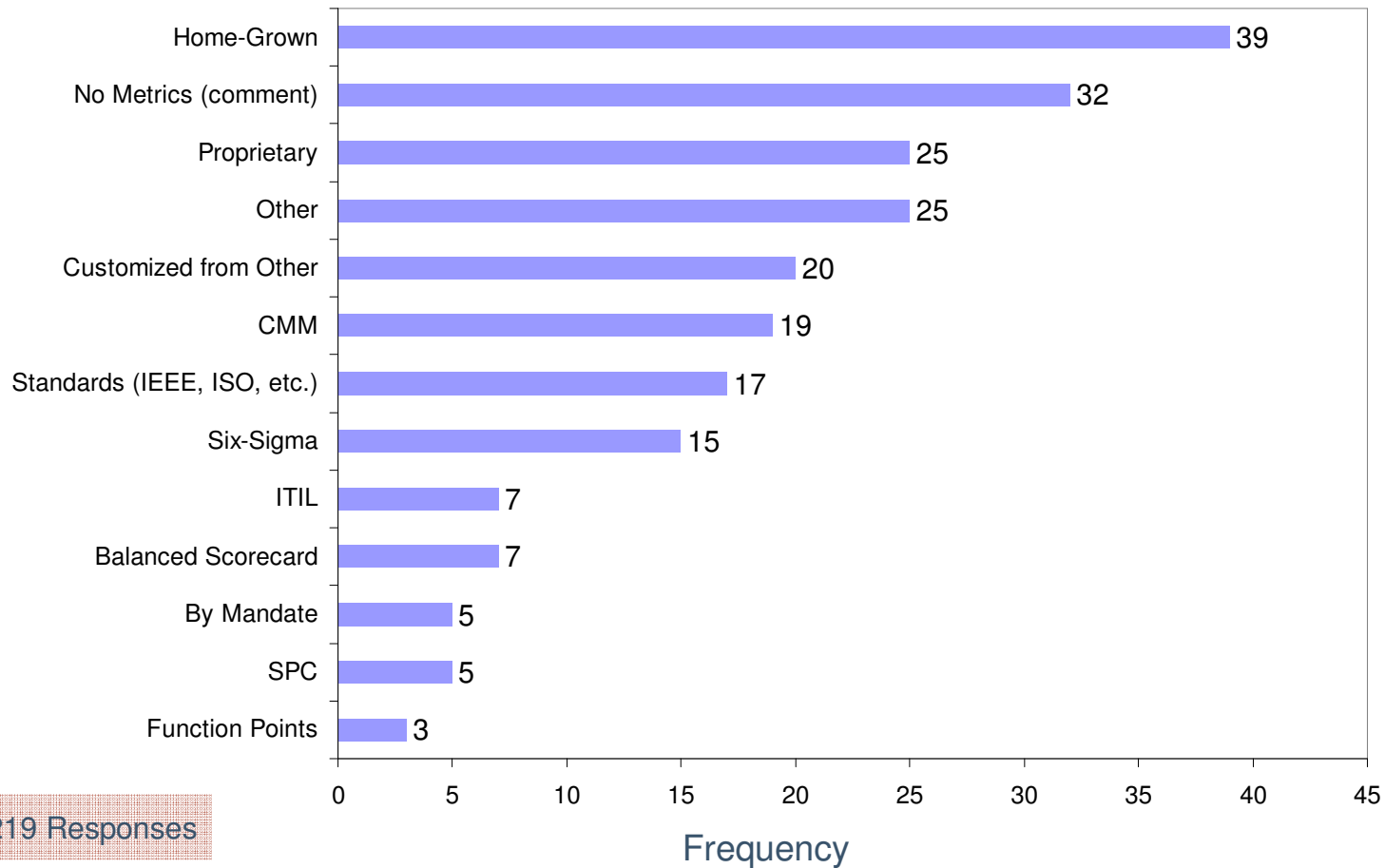- ❖ Summary Observations

Measurements that Are Reported

Frequency

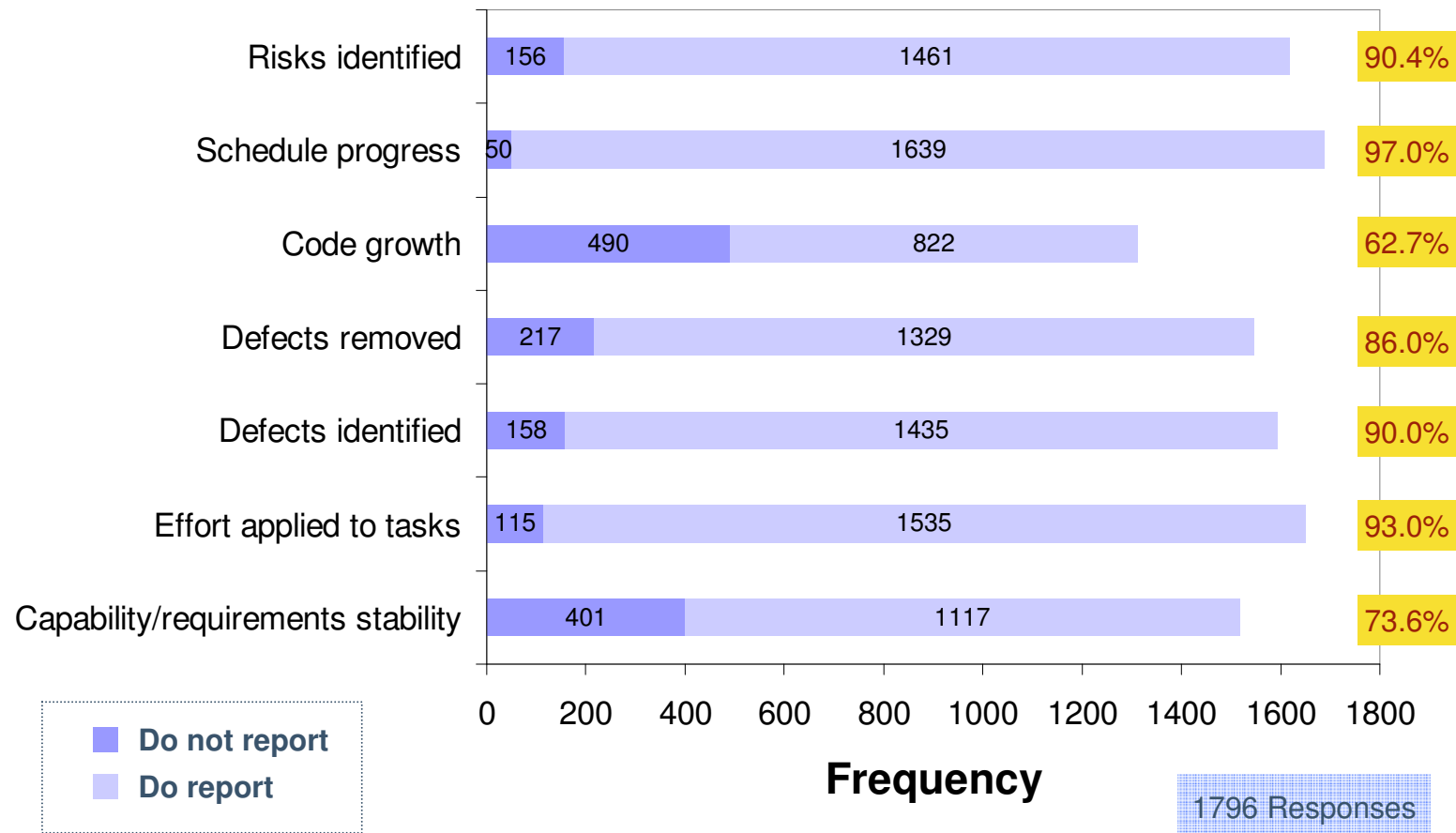| Category	Do not report	Do report	Percent
Risks identified	156	1461	90.4%
Schedule progress	50	1639	97.0%
Code growth	490	822	62.7%
Defects removed	217	1329	86.0%
Defects identified	158	1435	90.0%
Effort applied to tasks	115	1535	93.0%
Capability/requirements stability	401	1117	73.6%

■ Do not report
■ Do report

1796 Responses

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➡ Summary Observations

Summary Observations - 1

In general, there were significant differences in response patterns when comparing management versus staff.

Management	Staff
Executive	Engineer
Program Manager	Analyst
Project Manager	Programmer

Statistical tests of significance demonstrated that the differences were significant with confidence of at least 99% in all cases and 99.9% in some cases.

- Hypothesis test for equality of proportions
- Chi-Square test for significance

Summary Observations - 2

When compared to staff, management responded more strongly that

- they understand the purposes for measurement

- measurement helps their team perform better than without it

- they use measurement more often to understand the quality of their products and services

- they follow a documented process more often for collecting and reporting measurement data

- measurement definitions are commonly understood and consistent in their organization

- measurable criteria exist for their products and services

- corrective action is taken when a measurement-based threshold has been exceed

In general, the differences are statistically significant.

Summary Observations - 3

It is notable and a bit alarming that only 40.3% of all respondents reported that corrective action is taken when a measurement threshold has been exceeded.

Close to 20% of respondents reported that corrective action is rarely or *never* taken when a measurement threshold is exceeded.

Measurement doesn't help much unless the information is acted upon.

Act   Plan

Continuous
Improvement
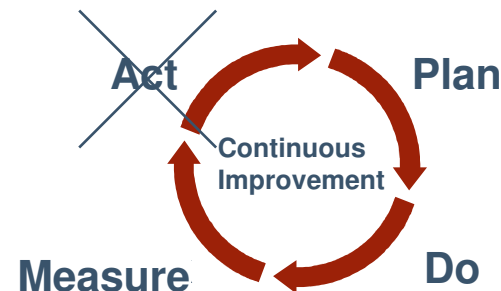
Measure   Do

Summary Observations - 4

Methods Used

The CMMI M&A Process Area was identified as a measurement method used most often to identify, collect, and analyze measurement data.

- Approximately 56% of respondents reported using the CMMI M&A Process Area.

- 27.4% of all respondents reported that the CMMI M&A Process Area was the *only* method that they used

41% of all respondents stated that they used only a single method for identifying, collecting, and analyzing measurement data. (59% use two ore more methods).

⚠ 21.1% (432 respondents) reported that they do not use any measurement method.

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Summary Observations - 5

Measures Reported

Schedule and time-on-task measures are most often reported.

- 97% of respondents indicated that schedule progress was a measure most often reported.

- 93% indicated that effort applied to task was reported.

- In addition, some respondents listed other measures that they report and 19.2% of these were related to time tracking.

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Summary Observations - 6

Measures Reported, continued

Code growth and Capability & Requirements Stability are measurements least reported by respondents.

- 27.3% do not report Code Growth

- 22.3% do not report Capability & Requirements Stability

Frequency of reporting measurement information varied depending on the measurement. However, most are reported on a weekly, monthly, or daily basis.

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Acknowledgements

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Wolf Goethert	Jim McCurley	Michael Zuccher
Laura Malone	Robert Stoddard	

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Finally, thank you to the individuals that took the time to assist us with this research by responding to this survey.